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SHORT REPORT

Abdominal Aortic Pseudoaneurysm Following Extracorporeal Shock Wave Lithotripsy (ESWL)

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Introduction

Extracorporeal shockwave lithotripsy (ESWL) has been used for the treatment of renal stones with excellent results. Shockwave lithotripsy, however, can involve vascular complications associated with hemorrhage that require clinical management. We report on a case where an abdominal aortic pseudoaneurysm developed after the treatment of bilateral renal stones with ESWL. The pseudoaneurysm was treated successfully by surgical excision and primary closure of the neck portion. For the patient who needs ESWL for treatment of renal stones and has atherosclerotic risk factors, we recommend screening the abdominal aortic pathology of severe calcification.

Case Report

A 61-year-old female was referred to our hospital for treatment of her abdominal aortic pseudoaneurysm that had developed after ESWL for the treatment of her bilateral renal stones. Pre-ESWL intravenous pyelogram (IVP) showed multiple bilateral renal stones ranging 3–4 mm in size, seven stones in left and eight stones in right kidney without any evidence of obstruction. ESWL using Dornier MPL 9200 was performed each kidney in 2 days apart. Follow-up renal ultrasonography showed remaining three stones in left and two stones in right kidney with perirenal fluid collection bilaterally. She complained of sustaining back pain after ESWL treatment. Her blood pressure and vital signs were stable, but the gradual deterioration of her condition during the next 3 days and decreased hemoglobin concentration (6.7 mg/dl) led to an abdominal CT scan (Fig. 1) on the fifth day after ESWL. We performed aortography (Fig. 2) for further evaluation of the abdominal aortic pseudoaneurysm that we saw on the abdominal CT scan. Her past medical history was positive for hypertension, hypercholesterolemia, diabetes mellitus, and chronic obstructive lung disease, but was negative for cigarette smoking.

We operated on the eighth day after ESWL.

The peritoneal cavity was opened using a long midline abdominal incision. After preparation for proximal control at the level of the supraceliac abdominal aorta, the retroperitoneal space was also opened through the mesentery after releasing the Treitz ligament. The pseudoaneurysm was about 5 cm in diameter and was located between inferiorly displace left renal vein and superiorly displaced splenic vein. We noted severe inflammatory changes around the perianeurysmal and the periaortic areas near the origin of the superior mesenteric artery and left renal artery. After freeing the left renal and splenic vein from the pseudoaneurysm, the pseudoaneurysm was further dissected, but ruptured during dissection. Immediately after proximal clamping at the supraceliac abdominal aorta, we partially excised the anterior wall of the pseudoaneurysm and closed the neck of the pseudoaneurysm by primary closure using a 3-0

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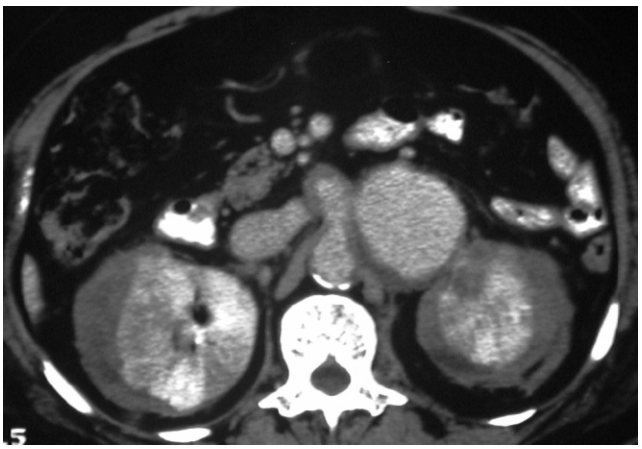

Fig. 1. Abdominal CT scan shows a large aneurysm at the left anterior portion of the aorta and subcapsular hematoma surrounding both kidneys. Small calcifications are also seen in the posterior wall of the aorta.

prolene interrupted suture. The neck of the pseudoaneurysm was 0.5 cm in diameter and was located at the lateral portion of the abdominal aorta just above the origin of the left renal artery. Aortic clamping time was approximately 15 min. Adequate urine volume was maintained during the operation and there was no critical change of intraoperative vital signs. We did not use systemic heparinization because of the urgency of the situation. Six pints of packed red blood cell were transfused perioperatively. We noted postoperative wound infection but it was healed by secondary intention.

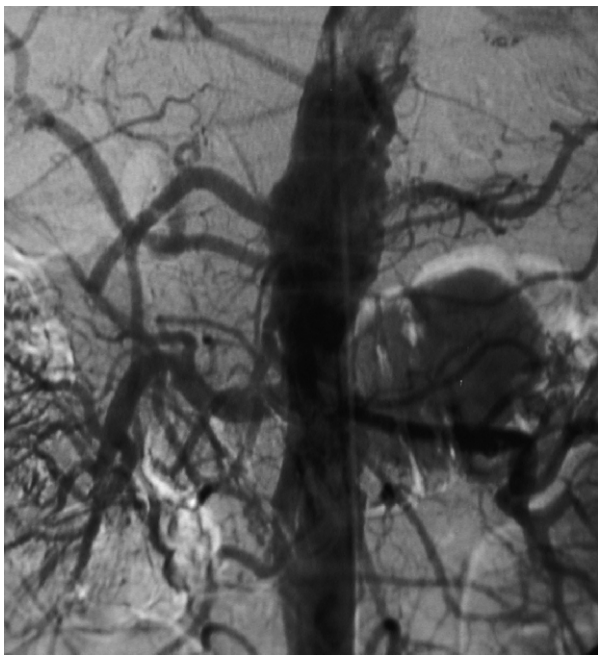

Fig. 2. Aortogram shows marked aortic wall irregularity and a large saccular aneurysm at the left side of the aorta near the upper portion of the left renal artery. Downward displacement of the left renal artery is seen due to mass effect of the aneurysm. There is no active bleeding from either renal artery.

Discussion

ESWL has been widely used for the treatment of renal stone disease, becoming the treatment of choice for 60–90% of all cases. As the technique becomes more widely available, deleterious side effects are becoming increasingly recognized. Vascular injury with bleeding is one of the most frequently reported complications.[1,2] ESWL uses a shockwave as an invasive tools to fragment and shatter the stones. It is considered as a safe procedure because the transmitted energy to the point 2 cm in distance from the focusing target is less than 20% of the calculated energy for fragmentation of the stone. Some authors reported successful ESWL without complications even in patients with abdominal aortic aneurysms.[3,4] However, there is still only limited agreement on the relative fragmentation mechanisms and much less agreement on the side effects.

In general, blunt aortic injuries may result in a spectrum of injuries, including simple contusions, intimal disruptions, intramural hematomas, false aneurysm formations, or frank ruptures.

Two distinct mechanisms have been proposed to account for most blunt injuries. First, avulsion of major or minor aortic branches results in contained retroperitoneal hematomas or free peritoneal rupture. The second mechanism involves an intimal tear with secondary aortic thrombosis. Reports of pseudoaneurysm for formation after blunt aortic injury are scarce. However, the effects of aortic wall pathology, such as degenerative change secondary to atherosclerosis, followed by rupture or pseudoaneurysm formation, has never been reported.[5]

In this case, a pseudoaneurysm was identified after ESWL and its formation was thought to be related to a severely calcified abdominal aorta and could have been preventable if pre-ESWL evaluation had been performed for aortic calcification followed by a more precise ESWL technique.

We therefore recommend screening the abdominal aortic pathology for severe calcification of patients who need ESWL for treatment of renal stones.

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